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University of Montana researcher seeks test for carriers of deadly horse disease

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UNIVERSITY OF MONTANA RESEARCHER SEEKS TEST
FOR CARRIERS OF DEADLY HORSE DISEASE

By Carol Susan Woodruff
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University of Montana researcher Tom North is working to develop a test for carriers of a mysterious and relatively new horse disease that kills foals within the first few months of life and has some parallels to AIDS.

The disease is combined immunodeficiency disease, or CID. It's a genetic defect found only in horses with Arabian blood and causes a seemingly healthy foal to develop a number of problems within weeks of being born due to its lack of an immune system.

"I think an extremely high priority should be put on finding a carrier test because if we don't do something about it (CID), it's going to keep increasing," says Bazy Tankersley, owner of Al-Marah Arabians in Tucson, Ariz., and a prominent horse breeder for about 50 years.

CID symptoms include respiratory distress, fever, nasal discharge, weakness, weight loss, dehydration and diarrhea. Blood tests show an extremely low level of white blood cells, which are key components of the immune system, and of the disease-fighting antibodies produced by some of those cells.

"Most of the things the foals die from are bacteria, viruses and fungi that all horses are exposed to and are able to fight off because of their immune system," explains North, an associate professor of

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biochemistry who also researches the AIDS virus in cats. He adds that people with AIDS, lacking an immune system, die of infections much the way CID foals do.

Veterinarians treat CID foals with antibiotics, intravenous feeding and anti-inflammatory medication, but to no avail. "The only one that has ever survived is one that was given a marrow transplant from a normal horse," North says, explaining that healthy bone marrow can produce an immune system. "That was done experimentally. It's not viewed as a way to treat horses with the disease."

Identified in the early 1970s by two Washington State University scientists, CID is now carried by 25 percent of Arabians and yearly kills 2 to 3 percent of Arabian foals. That figure translates into about 500 foals a year in the United States, according to an article by Purdue University's Allen Roussel and Cheryl Kouns in the March 1984 issue of Equine Practice magazine.

The loss of those foals represents both a big financial and emotional blow to breeders, says Mary Anne Grimmell of Elk River, Minn. She, like Bazy Tankersley, is a member of the FOAL Commission (Fight of Arabian Lethals) of the International Arabian Horse Association.

Five hundred foals are worth about $1,520,000 to $5,145,000, Grimmell says, including conservative estimates of stud fees, board and horseshoeing for the mare during her pregnancy, and mare and foal vet care. Her figures also include the sales price of an Arabian foal, which she says ranges from $250 to $7,500.

Medical treatment for a CID foal deepens the financial loss, of

course. Grimmell, for example, says she once racked up about $1,000 in vet bills before her CID foal died.

"People will pooh-pooh CID, but they really shouldn't; it's so devastating," she says, noting that one woman she knows lost all five of her foals to CID one year. "You really get close to a foal that's sick because you spend so much time with it. And you can't think just in terms of the foal, because you've invested a year of your life into this."

North, who began studying CID as a faculty member at Tufts University's vet school about five years ago, says researchers generally believe the disease is caused by a defect in a non-sex chromosome and occurs only when inherited from both parents.

Carriers show no signs of illness, so the only way to detect them is when they produce a CID foal -- a method North says is costly, time-consuming and often heartbreaking.

When two carriers are bred, 25 percent of the foals are born with CID, another 25 percent are normal, and 50 percent are carriers. A cross between a carrier and a normal horse can also produce carriers.

A carrier test would allow people to stop breeding a horse identified as a carrier or to avoid breeding one carrier to another, North explains.

The sooner scientists devise a test, the better, says Arizona's Tankersley. "Suppose this went on until three-quarters of the Arabians were carriers, and then we said we want to weed them all out," she says. "We'd be left with one quarter of the genetic pool."

Researchers suspect the disorder results from a missing enzyme, North says, adding that "we know that it is something that's very closely related metabolically to what the boy David was missing." David had no immune system and gained fame as the "Bubble Boy," living in a sterile bubble in Houston until he died of severe combined immunodeficiency disease at about age 12.

Funded by the Morris Animal Foundation and private sources, North has conducted studies comparing the white blood cells of CID foals and normal horses and their reactions to various compounds. One finding is that the foals, like some SCID patients, can't metabolize one of the building blocks of DNA.

With more funding, North would seek the gene responsible for CID by using DNA probes -- cloned fragments of equine DNA that could detect differences between the DNA of normal horses and CID foals. If he screened about 300 probes, his odds of finding the right one would be around 85 or 90 percent, according to a biotechnology company he consulted.

"Once we find the gene, with today's biotechnology, we know we can develop a test to pick up carriers," North says.

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